APPENDIX A:
REFERENCES: GLOSSARY OF TERMS

Glossary of Terms and Acronyms

The following terms and acronyms have been used throughout this manual. The definitions offered here reflect the intended meaning for these terms as used in this manual.

Allowances – Areas of flexibility within decision document language that allows different approaches or designs to be developed to satisfy a need in the design package. In general, a requirement is defined broadly so that the designer is not overly constrained in how the objective is met.

AOC – Area of Concern.

ARAR – Applicable or Relevant and Appropriate Requirement.

Area of Concern – discrete parcel or area of an installation for which historic information, physical evidence or other information suggests conditions may exist that will require a response.

ASTM – American Society for Testing and Materials.

BRAC – Base Realignment and Closure.

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act.

Closure – Point at which site reaches desired end state. This is interchangeable with site closeout.

Closure Report – Means of documenting the actions taken to reduce risk at a site to acceptable levels without the requirement for any further long-term care. This document usually coincides with removal of a site from the National Priorities List and includes information on the response taken and the results of all verification monitoring.

Competitive Procurement – A means of obtaining materials or services through solicitation of bids from at least three sources with the selection based on price and/or technical criteria on the basis of which the bidders compete.

Completion – Conclusion of the construction and startup phases of activity related to implementation of an environmental response at a site. (See Closure.)

Completion Report – Means of documenting the actions taken to complete construction at a site. Typically contains a statement of the problem that was addressed, a description of the technology employed to resolve the problem, as-builts, results of all monitoring activities conducted during construction, and verification that the objective of construction work was met.

Comprehensive Environmental Response, Compensation, and Liability Act – PL 96-510, also known as Superfund, is the enabling legislation passed in 1980 under which funds are made available and mechanisms are put in place to restore inactive properties that are found to have contamination at levels that pose unacceptable risks to human health or the environment. CERCLA was broadened through passage of the Superfund Amendments and Reauthorization Act (SARA) of 1986.

Conceptual Site Model – A depiction of key elements and interfaces that describe the fate and transport of contaminants from source to receptor at a given site or AOC.

Consensus – Agreement on the part of all parties to a decision as to the course of action. In the context of project management team decisions for environmental response, indicates that no single party is so opposed to the resolution that they will not stand behind the decision. Individual parties may not believe a decision is the best possible decision, but they must believe it is an acceptable decision.

Containment – Response actions with the objective of stopping further migration of contaminants in the environment. Example technologies include capping, hydraulic barriers, and liners.

Contingency – Action or plan of action designed to counteract the impact of conditions observed during implementation that deviate from the conditions assumed as the basis for designing a response. Contingency responses become the primary response when monitoring indicates the designed response cannot meet its objective. Contingencies are employed as a safety net so that implementation can proceed without having to characterize all site conditions to the point where they are known with certainty.

CSM – Conceptual Site Model.

Data Gap – Unknown value or condition, uncertainty.

Data Need – Data gap related to a parameter or condition for which the range of probable values is sufficient to affect a pending decision. Equates to significant uncertainty.

Data Quality Assurance – Process applied to determine the adequacy of data to support defined decisions.

Data Quality Objectives – A seven step planning process devised to focus and optimize data collection activities. Specific steps include:

1 - State the problem
2 - Identify decisions that address the problem
3 - Identify inputs affecting the decision
4 - Define boundaries of the study
5 - Develop decision rules
6 - Specify limits on uncertainty
7 - Optimize design for obtaining data

DataQUEST – EPA DQA software used in evaluating whether collected data support decision making within the constraints of the DQOs.

Decision Criteria – Values or conditions used as a metric for comparison of results indicating the point at which a decision changes. In the context of technology selection, the decision criterion is a threshold value for a parameter at which one technology becomes infeasible and another becomes the preferred alternative. Screening values and action levels are examples of decision criteria for specific phases of work in the environmental restoration program.

Decision Document – Instrument used to document the decision made as to how an environmental response problem is to be resolved. Under CERCLA, the document is a Record of Decision (ROD) or action memorandum. Under RCRA, the document is the statement of basis. In both cases, the document states the nature and extent of the problem being addressed, the objective of the response selected, the alternatives considered in the selection process, and requirements imposed on implementation of the response.

Decision Error Feasibility Trials – EPA DQO software used to identify the number of samples required to make a decision at a specified level of uncertainty.

Decision Logic – Sequencing of decisions and activities required to meet a specific programmatic objective such as categorization of AOCs or selection of a remedy. Decision logic is often depicted graphically with a decision logic flow diagram.

Decision Rule – A concept used to document what constitutes the basis for making a decision. The rule is structured as an "if, then" statement with the "if" portion setting the conditions which if encountered will result in the action prescribed in the "then" portion. One form used to facilitate communication with stakeholders is to make the problem statement the "if" portion of the rule and the planned response the "then" portion.

DEFT – Decision Error Feasibility Trials.

Dense, Non-Aqueous Phase Liquid – Low solubility liquid contaminant such as trichloroethylene that has a higher specific gravity than water, thus allowing it to form a pool of separate phase liquid at the bottom of the saturated zone or in pockets where it can not penetrate the pore throat between soil particles.

Design – The activity undertaken to translate the requirements and objective provided in a decision document into a set of instructions sufficiently detailed to implement the selected response and meet the objective. In a broader context, design includes all activities associated with development of the design package including identification of options during the scoping phase. However, for the purposes of this guidance, design is often referred to as detailed design, the quantitative translation of concepts into plans and specifications.

Design Package – Drawings, plans, specifications and related instructions required to enable the implementation contractor(s) to install the response properly.

Design Basis – Quantitative and qualitative description of the conditions, assumptions and performance specifications upon which a design is based.

Deviation – Condition or parameter which when encountered during implementation is found to differ from the design basis to the degree that it may be necessary to invoke a contingency to ensure meeting restoration objectives. Deviations arise because of an earlier decision to manage an uncertainty by preparing a contingency rather than conducting further investigations until the condition/parameter is characterized more fully.

Deviation monitoring – Procedures employed to observe site conditions or parameters whose values are fully delineated. When deviations are encountered during implementation of a response, they may dictate use of a contingency to ensure restoration objectives are met. This form of monitoring is predicated on the belief that the condition being monitored could have a value so different from that assumed during design that it will impact the ability to restore the site. Results of monitoring are reviewed to determine if a threshold is crossed indicating that the contingency is required.

DNAPL – Dense, Non-Aqueous Phase Liquid.

DOE – Department of Energy.

DQA – Data Quality Assurance.

DQO – Data Quality Objectives.

DQOPRO – EPA DQO software consisting of three programs:

SUCCESS-CALC - determines the number of samples required to detect a specified frequency of a characteristic occurring in the population.
ENVIRO-CALC - determines the number of samples required to estimate the average concentration for an area
HOT SPOT-CALCULATION - determines the number of samples required to locate a suspected circular or elliptical hot spot of specified size.

Dynamic Decision Making – Use of field analytical methods and pre-selected decision criteria to enable team to make decisions in the field on a real-time basis as a means of reducing mobilization/demobilization efforts.

End State – Target characteristics/conditions for site which response has been designed to attain.

Environmental Response – Set of activities performed to ensure that a site is restored to a state that does not pose unacceptable risks to human health or the environment. Environmental response may be conducted voluntarily or in response to programs initiated under RCRA (corrective measures), CERCLA (remedial actions), or analogous state programs.

EPA – U.S. Environmental Protection Agency.

Exit Strategy – Approach used to document site end state, actions necessary to reach that state, and amount, type, and derivation of data necessary to demonstrate that the end state has been reached (i.e., definition of necessary and sufficient information/data to demonstrate when an activity can be terminated). In some cases, such as with monitoring, the exit strategy may involve stages that effectively ramp down the activities as circumstances warrant.

False Negative Error – Analyst concludes the null hypothesis is true when, in fact, it is false.

False Positive Error – Analyst concludes the null hypothesis is false when, in fact, it is true.

Fatal Flaw – Condition or parameter value which impacts the implementability or efficacy of a response to the degree that the response will not meet the objective or is no longer the preferred option. A condition or parameter value that can be accommodated through extensive modification is considered a fatal flaw if the cost or impact of the modification are such that there is a more desirable response action that should be considered first.

Federal Facility Agreement – Instrument used to establish the schedule and framework within which environmental response will be conducted at federal sites. The term is often used interchangeably with Interagency Agreement (IAG). Agreements are negotiated between EPA and the federal entity responsible for the site and, in some cases, the host state.

FFA – Federal Facility Agreement.

Fixed Price – Contracts under which the client agrees to pay a fixed sum for delivery of a prescribed scope of work by the contractor regardless of the cost incurred to complete the scope.

Fixed Unit Price – Contracts under which the client agrees to pay a fixed sum per unit of work performed. Hence the total contract award is calculated as the product of the fixed unit rate and the number of units required.

FWPCA – Federal Water Pollution Control Act.

Gray Zone – The range of values near the decision criterion where the PMT is comfortable accepting the consequences of a decision error.

Hazard – Intrinsic property of a material or situation with the potential to cause harm.

Hierarchy Of Probable Technologies – A list of the technologies most likely to be selected for a response at a site ordered on the basis of most desirable first. The hierarchy is used to focus data collection efforts on parameters needed to evaluate the most likely response actions and to identify early in the process the alternatives that should be evaluated if the preferred technology is found to have a fatal flaw.

Implementability – Aspect of a response that characterizes the ease with which it can be installed and made functional. Contributing factors include availability of essential resources, access and spatial requirements, sensitivity to uncontrollable variables, and logistics.

Implementation – Activities associated with installation of a design through completion. Implementation generally encompasses construction, shakedown and startup. It does not include long-term monitoring.

ITR – Independent Technical Review.

Key Design Parameter – A characteristic of a site or technology the value for which will materially affect the design, cost and effectiveness of a response. Key design parameters are such that significant changes in value may render a technology unsuitable for a site or at least less desirable than an alternate. In the extreme, a key design parameter with an adverse value would be a fatal flaw.

LNAPL – Low Density, Non-Aqueous Phase Liquid.

Long-Term Care – Activities required after completion of construction (i.e., response complete) in order to maintain conditions that are protective of human health and the environment. Long-term care may include operation of response facilities (e.g., treatment plant for extracted groundwater), monitoring, and maintenance of containment and access barriers.

Long-Term Monitoring – Long-term monitoring is associated with responses that do not result in closure upon completion of construction. The intent of the monitoring is to verify that the response is working as designed, or alternately provide an advance warning that the response was not successful.

Low Density, Non-Aqueous Phase Liquid – Low solubility liquid contaminant such as gasoline or diesel fuel that has a lower specific gravity than water, thus allowing it to form a pool of separate phase liquid that will "float" on the surface of the water table.

LTRA – Long-Term Remedial Action site.

MNA – Monitored Natural Attenuation.

Monitored Natural Attenuation – Response action that relies on the presence of natural chemical, hydrogeological and biological conditions to degrade, denature and/or immobilize contaminants so that they do not comprise an unacceptable risk to human health or the environment. Key active elements of the approach are use of monitoring to verify that attenuation is proceeding as predicted and availability of contingencies to mitigate any risks that may arise due to insufficient attenuation.

National Oil and Hazardous Substances Pollution Contingency Plan a.k.a. National Contingency Plan – Regulation (40 CFR Part 300) that sets certain minimum requirements and provides the framework for environmental response actions.

NCP – National Contingency Plan.

Necessary Data – Those data that are required to make an informed decision.

NPL – National Priorities List.

Operations and Maintenance (O&M) – Activities required during period between construction completion and closure.

OU – Operable Unit.

Pathway – Functional chain between a source of contamination and a receptor by which contamination is transported through the environment and poses a risk. To be complete, a pathway must have a source, a release mechanism, a transport medium, an exposure mode and a receptor. Pathways are the building blocks from which the CSM is constructed.

Performance Measurement – Means of monitoring progress during the implementation of response actions and subsequent operation.

Plug-In Approach – Method of selecting a response wherein sets of qualifying conditions are specified and matched with corresponding technologies that would be best suited for those conditions. The plug-in approach is applied at facilities where there are numerous waste management units or release sites with virtually identical characteristics that lend themselves to development of generic responses.

PMT – Project Management Team.

Post-Construction – Period after completion of construction implementation activities. Specific activities or events may include long-term care, long-term monitoring, and closeout depending on the nature of the remedy applied and site conditions.

Pre-Decision Document Phase – Time period prior to issuance of the decision document. Pre-decision activities include scoping of the problem, site characterization, alternative evaluation/selection, and treatability studies.

Pre-Mobilization – Design and staging of required resources for a contingency prior to encountering the deviation that would necessitate implementation of the response.

Presumptive Remedy – Response found to be the preferred action for a given set of circumstances so often that its selection is presumed whenever those conditions prevail. Presumptive remedies are identified by the EPA in guidance documents that prescribe how and when they can be used.

PRG – Preliminary Remediation Goals.

Principles of Environmental Restoration – A set of four underlying concepts that have been identified as key to streamlining environmental response efforts. The principles in the order presented in this manual are:

- Principle One - Developing effective communication and cooperation with a project management team is essential
- Principle Two - Clear, concise, and accurate problem identification and definition are critical
- Principle Three - Early identification of likely response actions is possible, prudent, and necessary
- Principle Four - Uncertainties are inherent and will always need to be managed

Principle Threat Materials – Contaminated media and waste posing a risk at least one order-of-magnitude greater than the threshold of unacceptability. Historically, PTM has included materials posing a cancer risk of 10^{-3} or greater and/or having a hazard index of 1000 or greater. EPA has established programmatic expectations that if at all possible, PTM will be addressed with some form of treatment to reduce toxicity, volume, and/or mobility.

Problem Statement – Clear, concise statement of a site condition posing a real or potential unacceptable risk, or a condition that the PMT determines requires a response. The problem is the essence of why environmental response is necessary at a site and, therefore, relates to chemical contamination above thresholds of concern. The problem statement is derived to provide a simple focus for restoration activities. The use of problem statement here is broader than that applied in the DQO process wherein a problem statement refers to a specific decision that must be made and, therefore may address one subelement (e.g., the viability of a single pathway) of the problem in this larger context.

Project Delivery Strategy – Plan for how goods and services will be provided to accomplish the project objectives. The strategy typically addresses what will be performed in house, what will be contracted, how contracting will be conducted, and what type of contract vehicle will be employed.

Project Management Team – Primary decision making entity responsible for directing and overseeing prosecution of the project. The PMT usually includes the Base Environmental Coordinator or lead installation representative and the remedial project manager from the EPA and the lead state environmental regulatory agency. Only representatives from organizations with the ability to say "no" are on the PMT. Entities with advisory capacity may attend meetings, but if they do not have a vote, they are not on the PMT.

PTM – Principle Threat Materials.

PMT – Project Management Team.

QAPP – Quality Assurance Project Plan.

RAOs – Remedial Action Objectives.

RBCA – Risk Based Corrective Action.

RCRA – Resource Conservation and Recovery Act.

Regulator – Federal, state or local official with the authority to enforce the Federal Facility Agreement or other programs affecting environmental response activities. For DOD sites, the federal and state officials are the primary regulators in a decision-making role.

Regulatory Community – Officials with status as a regulator with regards to environmental response at a site.

Remedial Action Objectives – Desired outcome of response action(s) taken pursuant to an identified problem.

Remedial Action Operations – Activities conducted after construction and startup of a remedy pursuant to maintaining protectiveness. Examples include operation of treatment facilities and conduct of monitoring.

Requirements – Elements of a decision document which constrain the design and implementation activities by defining what must be included and what can not be included in the response. Specific areas incorporated in requirements include the problem being addressed, the objective of the restoration effort, the nature of the response, the definition of an acceptable end state, and other applicable or relevant and appropriate requirements. The latter category refers to items arising from the need to comply with other related federal, state, and/or local regulations.

Residual Uncertainty – Conditions or parameters not sufficiently characterized through investigation to be able to affirm their state or value with a desired level of confidence. A conscious decision has been made to manage these uncertainties through contingencies on the basis of lower projected costs or inability to reduce them through further investigation.

Resource Conservation and Recovery Act – PL 98-616, the enabling legislation passed in 1976 and amended by the Hazardous and Solid Waste Amendments in 1984 under which the generation, transportation, storage, treatment, and disposal of hazardous wastes are regulated. The corrective action segment of the regulatory program provides the framework for EPA and states to require restoration of contaminated sites as a condition for obtaining permits to continue hazardous waste-related activities. The corrective action program for restoration of active sites is the analog for the CERCLA remedial action program for inactive sites.

Response – The specific action or actions taken to resolve the condition creating a problem (regulatory requirement or unacceptable risk) at a site. In the RCRA program, the response may be a removal, stabilization or corrective action. In the CERCLA program, a response may be a removal or a remedial action.

Response Complete – The point at which cleanup goals for a site or group of sites under an operable unit have been met, the decision has been documented, and any necessary regulatory requirement for notification or application for concurrence has occurred.

Response Selection – The decision with regard to what technology to apply in order to accomplish environmental response objectives. This decision is formalized with issuance of the decision document.

Risk – The likelihood that impacts associated with a hazard will be realized. Risk is often calculated as the product of the probability of an event and the consequences of that event.

Risk Assessment – Evaluation of site characteristics, contamination levels and pathways to estimate the level of risk that exists under current and potential future use conditions.

Risk Management – Decisions made with respect to what actions will be taken to attain a state of acceptable levels of risk.

ROM – Restoration Oversight Manager.

SACM – Superfund Accelerated Cleanup Model.

SAFER – Streamlined Approach for Environmental Restoration.

SAP – Sampling and Analysis Plan.

SARA – Superfund Amendments and Reauthorization Act.

SCEM – Site Conceptual Exposure Model.

SCEM Builder – Software available on the internet to assist in construction of CSM.

Significant Uncertainty – Unknown condition or parameter value whose range of probable values spans a threshold or decision criterion such that a key decision may be altered pending resolution of the true value of the uncertainty. Significant uncertainties are equated to data needs in that resolution is required to make the pending decision. Resolution can be achieved by collecting relevant data to better specify the parameter value or condition, or by changing the decision being made so the threshold value or criterion is moved to a point where all probable values for the parameter fall above or below the criterion.

Sole Source – A procurement offered to a single supplier on the basis that the supplier is so uniquely qualified to provide the goods or services that there is nothing to be gained from attempting a competitive procurement or that a competitive procurement would delay time critical activities. Grounds for sole source justification may include access to proprietary technology or information; unique skills, knowledge or experience that would be difficult or impossible to duplicate; or ability to mobilize more quickly for time sensitive activities.

Source – Location or inventory of contaminants at concentrations that could pose an unacceptable risk if a complete pathway exists. Primary sources may include containers or accumulations of chemicals or wastes. Secondary sources may include media such as soil, groundwater, building surfaces and surface water that have been contaminated through migration of chemicals from a primary source.

Stakeholder – Individual or organization that is or will be impacted directly by site contamination or the restoration effort. At DOD sites, stakeholders include the DOD, state and federal regulators, Indian Nations, the local community, the public in general, and special interest groups such as environmental organizations and recreational users.

Stewardship – Term used to encompass post-construction activities such as operation and maintenance, long-term care, access restrictions, and long-term monitoring. In essence, stewardship is required for any site for which the response involves activities during an extended period between completion and closure, implying that a steward is needed to ensure that activities are conducted when required and in the required manner.

Streamlined Approach For Environmental Restoration – Approach to accelerating environmental response through application of data quality objectives and the observational approach as a means of focusing efforts to conserve resources.

Streamlining – Generic term for the organization of environmental response efforts in a manner that reduces cost and schedule from the baseline, process oriented approach that has historically been applied. Streamlining is an attempt to move quickly to the essential decisions in the restoration program by eliminating unnecessary data collection, redundant activities, and unproductive confrontations between stakeholders.

Sufficient Data – The set of all data adequate to make a decision at the PMT's desired level of confidence.

Superfund Accelerated Cleanup Model – Approach to environmental response that utilizes removal authority and early actions to promote material progress as quickly as possible, as well as, consolidating site assessment activities and response selection. SACM encourages use of presumptive remedies and related guidance to take advantage of experience gained from application of restoration programs over the years at sites with common characteristics.

Technology – General approach to a response action encompassing use of a particular chemical or physical phenomenon capable of meeting project objectives. Technologies are not specific to a unique design, but are specific to the underlying principles that make the technology effective

for its intended purpose. Biological treatment would be a technology. Within that technology, there would be numerous unit process options such as activated sludge, trickling filter, and extended aeration. Example technologies include:

Removal Technologies
- Excavation
- Extraction wells
- In-Well Stripping
- Soil Flushing
- Soil Vapor Extraction
- Solvent Flushing

Treatment (In-Situ or Ex-Situ)
- Biological Treatment
- Physical-Chemical Treatment
- Phytoremediation
- Soil Washing
- Stabilization/Solidification
- Thermal Destruction

Containment
- Barrier Walls
- Capping
- Permeable Treatment Barriers

Technologies can be defined more narrowly by indicating a subset of unit process options such as membrane separation technologies or in-situ bioremediation technologies.

Tolerant Technology – Technology that is sufficiently robust to accommodate the full range of probable values for an uncertain parameter or condition. Selection of a tolerant technology removes a significant uncertainty by changing the decision criterion to a point above or below the range of probable values for an uncertain parameter or condition.

Threshold – Specific value which divides the range of all possible values for a key design parameter into two subranges, such that presence in one subrange would change a decision on response selection or design when compared to presence in the other subrange. Thresholds are used in uncertainty management during design and implementation to indicate when a contingency is needed to counteract the potential impacts of encountering a deviation. May be synonymous with decision criteria for decisions related to selection and design of a remedy. For purposes of this manual, threshold is also referred to in the context of screening levels and levels for problem definition.

Unacceptable Risk – The level at which residual risk creates a situation deemed not protective of human health and /or the environment. There is no point of zero risk. As a consequence, it is necessary to define a level below which risk is small enough to be acceptable. Generally, that level is identified in the context of value relative to natural, unavoidable risk to which everyone is exposed. For the purposes of risk management at hazardous waste sites, the threshold of unacceptable risk has been defined as a cancer risk of 10^{-6} to 10^{-4} or a hazard index of 1 to 100.

Uncertainty – Parameter or condition for which a discrete value or state can not be determined with sufficient confidence. Synonymous with unknown. This is a broader definition then that used with the DQO Process. In the latter, uncertainty refers to the level of confidence with which a decision can be made.

Uncertainty Management – Approach to accommodating the reality that uncertainty is inherent in environmental response. Management is performed by balancing two alternative courses of action:

1) Reducing uncertainty by further characterizing the parameter or condition to narrow the range of possible values/states; and
2) Developing contingencies that counteract the impact of encountering values/states that cross a threshold value for the parameter/condition.

Uncertainty Matrix – A tool used to organize and facilitate consideration of uncertainty and its impacts on decisions. During pre-decision document activities, the uncertainty matrix is employed to assist in planning investigations and evaluating the effects of uncertainty on response selection. After issuance of a decision document, a design uncertainty matrix is used to assist in evaluating the effect of residual uncertainty on the design basis.

Uncertainty Mitigation – Selection of tolerant technologies or contingency plans that effectively move the decision criterion or threshold value above or below the range of probable values, thus removing the significance of an uncertainty.

Uncertainty Reduction – Collection of information to narrow the range of probable values for an uncertain parameter or condition. If uncertainty is not reduced to a range that does not span a threshold value, an alternate design or contingencies are needed to effectively move the threshold above or below the range of probable values.

USAEC – United States Army Environmental Center.